

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-16. (Canceled)

17. (Currently amended) A method for reducing shrinkage during sintering low-temperature-cofired ceramics, the ceramics comprising a dielectric portion and a heterogeneous material portion, the method comprising the steps of:

(a) providing a monolithic structure, the monolithic structure comprising:

a dielectric body comprising at least one dielectric layer that comprises at least one active area; wherein said active area is disposed with at least one heterogeneous material pattern, and said heterogeneous material pattern comprises at least one heterogeneous material component and/or module; and

a constraining layer positioned on the top of the dielectric body, the constraining layer comprising at least one window and wherein the edge of the active area of the dielectric layer each falls within the window in vertical direction; wherein the constraining layer positioned on the top of the dielectric body is a high sintering temperature constraining layer with a sintering temperature higher than that of the dielectric layer;

(b) firing the monolithic structure; and

(c) singulating the monolithic structure along a cutting line to provide the low-temperature-cofired ceramics, wherein the cutting line is disposed in the area formed between the edge of the window and the edge of the active area.

18. (Original) The method according to Claim 17, wherein the high sintering temperature constraining layer comprises Al₂O₃.

19. (Currently amended) A method for reducing shrinkage during sintering low-temperature-cofired ceramics, the ceramics comprising a dielectric portion and a heterogeneous material portion, the method comprising the steps of:

(a) providing a monolithic structure, the monolithic structure comprising;

a dielectric body comprising at least one dielectric layer that comprises at least one active area; wherein said active area is disposed with at least one heterogeneous material pattern, and said heterogeneous material pattern comprises at least one heterogeneous material component and/or module;

and a constraining layer positioned on the top of the dielectric body, the constraining layer comprising at least one window and wherein the edge of the active area of the dielectric layer each falls within the window in vertical direction; wherein the constraining layer positioned on the top of the dielectric body is a low sintering temperature constraining layer with a sintering temperature lower than that of the dielectric layer;

(b) firing the monolithic structure; and

(c) singulating the monolithic structure along a cutting line to provide the low-temperature-cofired ceramics, wherein the cutting line is disposed in the area formed between the edge of the window and the edge of the active area.

20. (Original) The method according to Claim 19, wherein the low sintering temperature constraining layer comprises about 1 % to about 10 % of a strong auxiliary component to lower the sintering temperature of the constraining layer.

21. (Original) The method according to Claim 20, wherein the strong auxiliary component is vanadium oxide.

22-29. (Canceled)

30. (New) The method according to Claim 17, wherein the edges of a plurality of the active areas as a whole each fall within the windows.

31. (New) The method according to Claim 17, wherein the dielectric body comprises at least two of the dielectric layers, and the edge of the active area of any of the dielectric layer each falls within the window of the constraining layer position on the top of the dielectric body in vertical direction.

32. (New) The method according to Claim 31, wherein the dielectric body further comprises a constraining layer positioned between the dielectric layers of the dielectric body, the constraining layer comprising at least one window, and the edge of the active area of the dielectric layer each falls within the window of the constraining layer in vertical direction.

33. (New) The method according to Claim 32, wherein the thickness of the constraining layer (L_1) applied between the dielectric layers of the dielectric body is not thinner than the thickness of the heterogeneous material pattern (L_2) disposed on the dielectric layer positioned adjacent and below the constraining layer.

34. (New) The method according to Claim 33, wherein $L_1 = L_2$.

35. (New) The method according to Claim 17, wherein the monolithic structure further comprises a constraining layer positioned on the bottom the dielectric body.

36. (New) The method according to Claim 35, wherein the constraining layer positioned on the bottom the dielectric body comprises at least one window, and the edge of the active area of the dielectric layer each falls within the window of the constraining layer positioned on the bottom the dielectric body in vertical direction.

37. (New) The method according to Claim 35, wherein a ratio (L_4/L_3) of the total thickness of the dielectric body (L_4) and the thickness of the constraining layer (L_3) positioned on the top or bottom of the dielectric body is less than about 3.5.

38. (New) The method according to Claim 17, wherein the monolithic structure further comprises

a cover layer positioned on the constraining layer; and

a constraining layer positioned on the cover layer.

39. (New) The method according to Claim 17, wherein the monolithic structure further comprises

a cover layer positioned on the bottom of the dielectric body; and

a constraining layer positioned below the cover layer.

40. (New) The method according to Claim 17, wherein the monolithic structure further comprises a constraining layer (disposed on the top of the dielectric body) - m dielectric layers and n constraining layers alternated in the dielectric body - a constraining layer (disposed on the bottom of the dielectric body), wherein m is greater than n.

41. (New) The method according to Claim 17, wherein the monolithic structure further comprises a constraining layer - a cover layer - a constraining layer (disposed on the top of the dielectric body) - m dielectric layers and n constraining layers alternated in the dielectric body - a constraining layer (disposed on the bottom of the dielectric body) - a cover layer - a constraining layer, wherein m is greater than n.

42. (New) The method according to Claim 41, wherein m is equal to n + 1.

43. (New) The method according to Claim 17, wherein the shortest length of the constraining layer is L; the diameter of a circumscribed circle of each window is c; the distance between the adjacent circumscribed circles is a; the distance between the outermost window and the edge of the constraining layer is b, $c < 0.5L$, $a > 0.1c$, $b > 0.1c$.

44. (New) The method according to Claim 17, wherein a Z-direction of pressure is applied during firing.

45. (New) The method according to Claim 17, wherein bonding glass is applied between the dielectric body and the constraining layer positioned on the top of the dielectric body.

46. (New) The method according to Claim 17, wherein the bonding glass comprises borosilicate glass.

47. (New) The method according to Claim 17, wherein at least one of the dielectric layers and the constraining layer positioned on the top of the dielectric body comprise bonding glass.

48. (New) The method according to Claim 47, wherein the constraining layer comprises about 1% to about 10% of bonding glass.

49. (New) The method according to Claim 48, wherein the constraining layer comprises about 1% to about 6% of bonding glass.

50. (New) The method according to Claim 17, wherein singulating the monolithic structure in step (c) is selected from sawing, cutting, laser cutting, or dicing.

51. (New) The method according to Claim 17, which further comprises the step (d) singulating the monolithic structure along the edge of the active area of the dielectric layer.

52. (New) The method according to Claim 19, wherein the edges of a plurality of the active areas as a whole each fall within the windows.

53. (New) The method according to Claim 19, wherein the dielectric body comprises at least two of the dielectric layers, and the edge of the active area of any of the dielectric layer each falls within the window of the constraining layer position on the top of the dielectric body in vertical direction.

54. (New) The method according to Claim 53, wherein the dielectric body further comprises a constraining layer positioned between the dielectric layers of the dielectric body, the constraining layer comprising at least one window, and the edge of the active area of the dielectric layer each falls within the window of the constraining layer in vertical direction.

55. (New) The method according to Claim 54, wherein the thickness of the constraining layer (L_1) applied between the dielectric layers of the dielectric body is not thinner than the thickness of the heterogeneous material pattern (L_2) disposed on the dielectric layer positioned adjacent and below the constraining layer.

56. (New) The method according to Claim 55, wherein $L_1 = L_2$.

57. (New) The method according to Claim 19, wherein the monolithic structure further comprises a constraining layer positioned on the bottom the dielectric body.

58. (New) The method according to Claim 57, wherein the constraining layer positioned on the bottom the dielectric body comprises at least one window, and the edge of the active area of the dielectric layer each falls within the window of the constraining layer positioned on the bottom the dielectric body in vertical direction.

59. (New) The method according to Claim 57, wherein a ratio (L_4/L_3) of the total thickness of the dielectric body (L_4) and the thickness of the constraining layer (L_3) positioned on the top or bottom of the dielectric body is less than about 3.5.

60. (New) The method according to Claim 19, wherein the monolithic structure further comprises

a cover layer positioned on the constraining layer; and

a constraining layer positioned on the cover layer.

61. (New) The method according to Claim 19, wherein the monolithic structure further comprises

a cover layer positioned on the bottom of the dielectric body; and

a constraining layer positioned below the cover layer.

62. (New) The method according to Claim 19, wherein the monolithic structure further comprises a constraining layer (disposed on the top of the dielectric body) - m dielectric layers and n constraining layers alternated in the dielectric body - a constraining layer (disposed on the bottom of the dielectric body), wherein m is greater than n.

63. (New) The method according to Claim 19, wherein the monolithic structure further comprises a constraining layer - a cover layer - a constraining layer (disposed on the top of the dielectric body) - m dielectric layers and n constraining layers alternated in the dielectric body - a

constraining layer (disposed on the bottom of the dielectric body) – a cover layer – a constraining layer, wherein m is greater than n.

64. (New) The method according to Claim 63, wherein m is equal to n + 1.

65. (New) The method according to Claim 19, wherein the shortest length of the constraining layer is L; the diameter of a circumscribed circle of each window is c; the distance between the adjacent circumscribed circles is a; the distance between the outermost window and the edge of the constraining layer is b, $c < 0.5L$, $a > 0.1c$, $b > 0.1c$.

66. (New) The method according to Claim 19, wherein a Z-direction of pressure is applied during firing.

67. (New) The method according to Claim 19, wherein bonding glass is applied between the dielectric body and the constraining layer positioned on the top of the dielectric body.

68. (New) The method according to Claim 67, wherein the bonding glass comprises borosilicate glass.

69. (New) The method according to Claim 19, wherein at least one of the dielectric layers and the constraining layer positioned on the top of the dielectric body comprise bonding glass.

70. (New) The method according to Claim 69, wherein the constraining layer comprises about 1% to about 10% of bonding glass.

71. (New) The method according to Claim 70, wherein the constraining layer comprises about 1% to about 6% of bonding glass.

72. (New) The method according to Claim 19, wherein singulating the monolithic structure in step (c) is selected from sawing, cutting, laser cutting, or dicing.

73. (New) The method according to Claim 19, which further comprises the step (d) singulating the monolithic structure along the edge of the active area of the dielectric layer.